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FULBRIGHT & JAWORSKI, LLP				
666 FIFTH AVE				
NEW YORK, NY 10103-3198				
EXAMINER				
SHEH, ANTHONY H				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/580,124

**Applicant(s)**

HIRTHE ET AL.

**Examiner**

ANTHONY H. SHEH

**Art Unit**

4151

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 16-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/55/08)  
Paper No(s)/Mail Date 05/19/2006
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement filed 05/19/2006 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

### *Claim Objections*

2. Claims 16, 19-20, 30 are objected to because of the following informalities:
- (a). Claim 16 lines 4-5: the ranges for x, y, and should be more explicit, e.g. does x indicate whole numbers between 1 and 18 inclusive or exclusive?
  - (b). Claim 19 lines 2-3: the ranges for x, y, and should be more explicit, e.g. does x indicate whole numbers between 1 and 5 inclusive or exclusive?
  - (c). Claim 20 line 1: "wherein the following said inorganic metal phosphate" should be amended to -- wherein said inorganic metal phosphate --.
  - (d). Claim 20 line 4: " $\text{Cu}_x\text{Zn}_y\text{ZnPO}_4(\text{OH})_3 \cdot 2(\text{H}_2\text{O})$ " should be amended to --  $(\text{Cu}_x\text{Zn}_y)_2\text{ZnPO}_4(\text{OH})_3 \cdot 2(\text{H}_2\text{O})$  --.
  - (e). Claim 30 line 2: "but heating" should be amended to -- by heating --.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 16-19, 23-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Anderson (US 3980611, hereafter '611).

3. Regarding claims 16, and 19, '611 teaches a thermoplastic polymeric material (col. 1, ln 35-48) containing tribasic calcium phosphate having the formula  $3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{Ca}(\text{OH})_2$  (col. 2, ln. 25-28). The aforementioned phosphate is a species of the inorganic metal phosphate having the general formula as  $\text{Me}_x(\text{PO}_4)_y(\text{OH})_z$ , wherein Me consists of one or more elements from the group Fe, Mn, Sb, Ti, Ni, Co, V, Mg, Bi, Be, Al, Ce, Ba, Sr, Na, K, Ge, Ga, Ca, Cr, In, or Sn, and x, y, and z satisfy the ranges as claimed, and the inorganic metal phosphate may optionally also contain water of crystallization. "A generic claim cannot be allowed to an applicant if the prior art discloses a species falling within the claimed genus." The species in that case will anticipate the genus. *In re Slayter*, 276 F.2d 408, 411, 125 USPQ 345, 347 (CCPA 1960); *In re Gosteli*, 872 F.2d 1008, 10 USPQ2d 1614 (Fed. Cir. 1989).

4. Regarding claim 17, '611 teaches wherein said plastic is selected from the group including polyesters (col. 1, ln. 62), polyamides (col. 1, ln. 63), vinyl polymers (col. 1, ln. 65), and polyalkylenes (polyolefins, col. 1, ln. 64).

5. Regarding claim 18, '611 teaches wherein said plastic is selected from the group including polyethylene terephthalate (col. 1, ln. 62-63) and polypropylene (col. 1, ln. 64).
6. Regarding claim 23, '611 teaches wherein the inorganic metal phosphate has particle sizes from 2.5 microns up to 10 microns (col. 2, ln. 57-58). The range disclosed by the reference overlaps the range of the instant claim, 0.005 to 5  $\mu\text{m}$ .
7. Regarding claim 24, '611 teaches wherein the inorganic metal phosphate has particle sizes less than 1 micron. The range disclosed by the reference overlaps the range of the instant claim, 0.001 to 2  $\mu\text{m}$ .

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walsh (EP 0604074 A1, hereafter '074) in view of Aramaki (US 6506826 B1, hereafter '826).

7. Regarding claim 16, '074 teaches a thermoplastic material comprising at least one inorganic metal phosphate wherein the metal consists of one or more elements from the group including group IB or group IIB metals, e.g. Cu, Zn (p. 5, ln. 24-25). Furthermore, '074 suggests that, in general, "phosphorous-containing compounds are desirable in thermoplastic compositions with respect to melt stability (p. 2, ln. 34-37).

8. '074 does not teach a thermoplastic material comprising at least one inorganic metal phosphate of the general formula  $\text{Me}_x(\text{PO}_4)_y(\text{OH})_z$  wherein Me consists of one or more elements from the group Fe, Mn, Sb, Ti, Ni, Co, V, Mg, Bi, Be, Al, Ce, Ba, Sr, Na, K, Ge, Ga, Ca, Cr, In, or Sn, and wherein x and y are whole numbers and  $x = (1 \dots 18)$ ,  $y = (1 \dots 12)$  and  $z = (0.2 \dots 10)$ , and the inorganic metal phosphate may optionally also contain water of crystallization.

9. In the same field of endeavor of thermoplastic compositions, '826 teaches a material comprising at least one compound of the formula  $\text{A}_{10-z}(\text{HPO}_4)_z(\text{PO}_4)_{8-z}(\text{X})_2$ .

$z \cdot nH_2O$  wherein  $0 \leq z \leq 2$ ,  $0 \leq n \leq 16$ , and A is a metal element of groups 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8, 1B, 2B, and 3B of the periodic table, tin and lead, singly or in combination (col. 5, ln. 36-50), and X is an anion including the hydroxyl ion, OH<sup>-</sup> (col. 5, ln. 51-52). Wherein  $z=0$ , the aforementioned formula reads on the instant claim. Additionally, the reference discloses that phosphate compounds of this type are known in the art as apatites (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to consider, based on the disclosure of '826, compounds in accordance with the formula of the instant claim as reasonable choices, with respect to the phosphate-containing compounds, as taught by '074, as the addition of such compounds could reasonably be expected to improve melt properties of a thermoplastic resin.

10. Regarding claim 17, '074 teaches the thermoplastic material further comprising one or more plastic selected from a group including polalkylenes ("polybutylene terephthalate", p. 2, ln. 50), polyesters (p. 2, ln. 50), and polyacrylates (p. 5, ln. 40).

11. Regarding claim 18, '074 teaches wherein said plastic is chosen from a group including polyethylene terephthalate, and polybutylene terephthalate (p. 3, ln. 9).

12. Regarding claim 19, the combination of '074 and '826 does not explicitly teach wherein the following are satisfied for the general formula  $Me_x(PO_4)_y(OH)_z$ :  $x = (1 \dots 5)$ ,  $y = (1 \dots 4)$  and  $z = (0.2 \dots 5)$ . However, one of ordinary skill in the art at the time of the invention would have considered compounds in accordance with the aforementioned formula to be obvious, as such compounds, being metal phosphate-containing apatites,

are suggested by the prior art as improving melt properties of thermoplastic compositions.

13. Regarding claim 20, the combination of '074 and '826 does not explicitly teach wherein said inorganic metal phosphate is selected from the group as claimed. However, one of ordinary skill in the art at the time of the invention would have considered compounds listed above to be obvious, as such compounds, being metal phosphate-containing apatites, are suggested by the prior art as improving melt properties of thermoplastic compositions.

14. Regarding claim 21, '074 teaches wherein the amount of inorganic metal phosphates added is from 0.2 to 1% by weight, expressed in terms of the final thermoplastic polymeric material. The range disclosed by the prior art overlaps the claimed range, 0.0002 to 2 wt%.

15. Regarding claim 22, '074 teaches wherein the amount of inorganic metal phosphates added is about 0.1% by weight, expressed in terms of the final thermoplastic polymeric material. The range disclosed by the prior art touches the claimed range, 0.001 to 0.1 wt%.

16. Regarding claims 23 and 24, '826 teaches wherein the inorganic metal phosphate has an average particle size not greater than 1  $\mu\text{m}$  (i.e. less than 1  $\mu\text{m}$ ). The range recited by the reference overlaps the ranges as claimed in claim 23 and 24. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize inorganic metal phosphate particles falling within the aforementioned range as the phosphate-containing compound in the thermoplastic composition of '074, as '826



notes this range as being preferred for effective dispersion of the inorganic metal phosphate in the thermoplastic (col. 2, ln. 48-56).

17. Claims 25-28 is rejected under 35 U.S.C. 103(a) as being unpatentable over '074, in view of '826, and in still further view of Hund (US 4153465, hereafter '465).

18. Regarding claim 25, '074 teaches a method of preparation of thermoplastic polymer materials containing at least one inorganic metal phosphate wherein a product is incorporated into a thermoplastic polymeric material (p. 7, ln. 16-19).

19. '074 does not teach the process wherein the inorganic metal phosphate has the general formula  $\text{Me}_x(\text{PO}_4)_y(\text{OH})_z$ , and a solution of the relevant metal ion, or the relevant metal ions, and a solution of the relevant  $\text{PO}_4$  component in an aqueous medium are precipitated, the product obtained is dried.

20. In the same field of endeavor of thermoplastic compositions, '826 teaches a material comprising at least one compound of the formula  $\text{A}_{10-z}(\text{HPO}_4)_z(\text{PO}_4)_{6-z}(\text{X})_{2-z}\cdot n\text{H}_2\text{O}$  wherein  $0 \leq z \leq 2$ ,  $0 \leq n \leq 16$ , and A is a metal element of groups 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8, 1B, 2B, and 3B of the periodic table, tin and lead, singly or in combination (col. 5, ln. 36-50), and X is a anion including the hydroxyl ion,  $\text{OH}^-$  (col. 5, ln. 51-52). Wherein  $z=0$ , the aforementioned formula reads on the instant claim. Additionally, the reference discloses that phosphate compounds of this type are known in the art as apatites (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to consider, based on the disclosure of '826, compounds in accordance with the formula of the instant claim as reasonable choices, with respect to

the phosphate-containing compounds, as taught by '074, as the addition of such compounds could reasonably be expected to improve melt properties of a thermoplastic resin.

21. The combination of '074 and '826 still does not teach wherein a solution of the relevant metal ion, or the relevant metal ions and a solution of the relevant metal ion, or the relevant metal ions, and a solution of the relevant  $\text{PO}_4$  component in an aqueous medium are precipitated, the product obtained is dried.

22. In an analogous art of forming inorganic metal phosphates, '465 teaches wherein a solution of the relevant metal ion, or the relevant metal ions (" $\text{ZnCl}_2$ " and " $\text{CaCl}_2$ ", col. 3, In. 46-47), and a solution of the relevant  $\text{PO}_4$  component in an aqueous medium are precipitated, the product obtained is dried (col. 2, In. 41-52). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method disclosed by '465 to form the inorganic metal phosphate for incorporation into a thermoplastic polymer composition, as taught by '074 and '826, as such a method is well-known in the art as capable of producing the inorganic metal phosphates of the present invention.

23. Regarding claim 26, '826 teaches wherein corresponding solutions of chlorides, hydroxides or oxides are used as the metal ion solution (col. 7, In. 44-54). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize these salts due to their "excellent economy and physical properties" (col. 7, In. 45-54).

24. Regarding claim 27, '826 teaches wherein phosphoric acid or solutions of its soluble salts are used as the solution for the  $\text{PO}_4$  component (col. 6, In. 3-19). It would

have been obvious to one of ordinary skill in the art at the time of the invention to utilize these compounds as it is well-known that they readily disassociate their phosphate groups in aqueous solutions.

25. Regarding claim 28, '465 teaches wherein the precipitation products are heat treated in the dry state in order to form the desired metal phosphate (col. 4, ln. 40-64). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method disclosed by '465 to form the inorganic metal phosphate for incorporation into a thermoplastic polymer composition, as taught by '074 and '826, as such a method is well-known in the art as capable of producing the inorganic metal phosphates of the present invention.

26. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over '074 and '826 as applied to claims 16-28 above, and further in view of Pengilly (US 4408004, hereafter '004).

27. Regarding claim 29, the combination of '074 and '826 teaches a thermoplastic polymeric material according to claim 16.

28. The combination of '074 and '826 does not teach heating with IR radiation said thermoplastic polymeric material and subsequently subjecting it to further processing to shape them.

29. In an analogous art of molding thermoplastic polymeric materials, '004 teaches heating with IR radiation said thermoplastic polymeric material and subsequently subjecting it to further processing to shape them (col. 6, ln. 26-43). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method

of '004 to soften the thermoplastic polymeric material as taught by '074 and '826 as such a method is well-known in the art.

30. Regarding claim 29, the combination of '074 and '826 teaches a thermoplastic polymeric material according to claim 16.

31. The combination of '074 and '826 does not teach heating with IR radiation said thermoplastic polymeric material and subsequently processing to form a consumer article and packaging.

32. In an analogous art of molding thermoplastic polymeric materials, '004 teaches heating with heating with IR radiation said thermoplastic polymeric material and subsequently processing to form a consumer article and packaging ("beverage bottle", col. 6, ln. 26-43). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of '004 to soften the thermoplastic polymeric material as taught by '074 and '826 as such a method is well-known in the art.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Aramaki (US 7067577 B2) discloses the use of apatite nanorods in polymeric resins

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY H. SHEH whose telephone number is (571)270-7746. The examiner can normally be reached on Monday to Thursday, 9:30-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571)272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AS

*/Angela Ortiz/*

***Supervisory Patent Examiner, Art Unit 4151***